Optically Addressed Spatial Light Modulator – Development Kit

DESCRIPTION

The OASLM Development Kit is a turnkey set-up to start working with an *Optically Addressed Spatial Light Modulator* right away: the modulator, its electrical driver, a programmable light projector to write the images and the software, ready to be placed on the optical table.

KIT CONTENTS

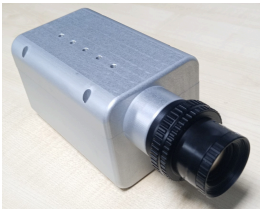
- **OASLM-VIS** optically addressed spatial light modulator
- **HOA-20K** electrical driver
- **LC-PROJ** programmable light projector (writing light)
- Software (Linux, Windows, macOS) with Python interface, on a USB key
- Cables, power supplies, mechanical mounts and screws
- Documentation and operating instructions, in a carrying case



LC-PROJ LIGHT PROJECTOR

LED projector shaped by an integrated, factory-calibrated liquid-crystal modulator: the output intensity is proportional to the gray level.

- Blue LED (470 nm), linearly polarized output
- 1920 × 1080 pixels, 35 mm spot at 3.8× magnification
- HDMI: seen by the computer as a second monitor



OASLM-VIS

Liquid-crystal light valve with a continuous photoconductor in place of pixels.

- Writing light 400 – 600 nm, reading light 400 nm – 2 µm
- Phase modulation of several π, or intensity modulation
- No pixels: 100 % fill factor, no diffraction losses
- Spatial resolution about 25 µm
- Clear aperture 20 × 20 mm

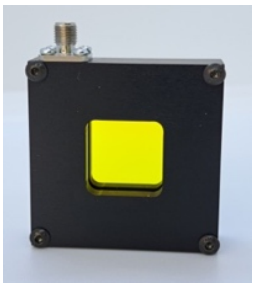


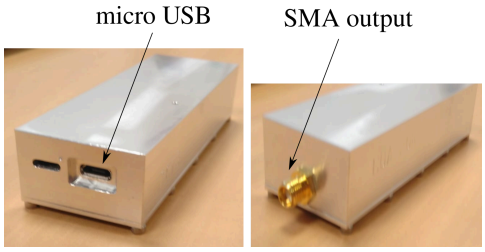


Image written on the OASLM, seen through the reading beam.

HOA-20K ELECTRICAL DRIVER

Low-noise sine-wave generator designed for liquid-crystal devices.

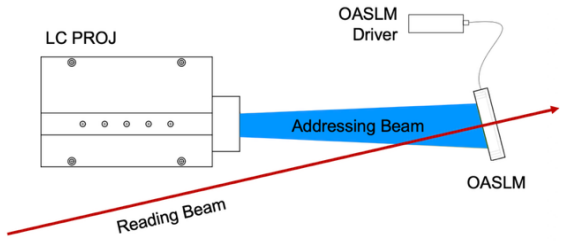
- 0 – 28 Vrms (80 V peak to peak), 0 – 20 kHz, no DC component
- Programmable over USB, graphical interface, sweeps and sequences
- Internal battery (8 h): operation without mains power



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HOW IT WORKS

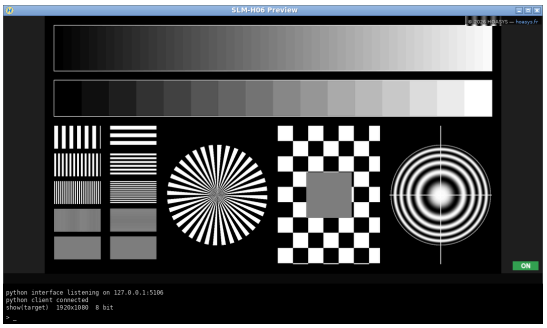
The LC-PROJ projects an image (the writing light) on the photoconductor of the OASLM, driven by the HOA-20K. The reading beam that crosses the OASLM picks up this image as a phase pattern, or as an intensity pattern between crossed polarizers. Patterns are sent from the computer as plain images or live from Python. An in-line configuration can be made with a dichroic mirror or a polarizing beam splitter.



SOFTWARE

The included software (Linux, Windows, macOS) displays images, videos or live frames on the LC-PROJ, from a preview window with a built-in command console (zoom, rotation, shift, gain, regions of interest).

Python client included: a NumPy array is written on the OASLM in real time with a single line of code, `slm.show(image)`. Patterns can be computed by machine-learning models or optimized in closed loop with a camera.



APPLICATIONS

- Reconfigurable phase, intensity and polarization masks
- Laser beam shaping and beam cleanup
- Wavelength conversion
- Holography, interferometry, optical sensors
- Microscopy, imaging systems
- Nonlinear optics and optical wave-mixing
- Optical neural networks: nonlinear optical activation functions
- Optical computing and complex optics, vortex beams



TYPICAL CHARACTERISTICS

Item	OASLM Dev-Kit
OASLM-VIS	Transmission mode, writing 400 – 600 nm, reading 400 nm – 2 µm, clear aperture 20 × 20 mm, spatial resolution ≈ 25 µm
Modulation	Phase (several π) or intensity between crossed polarizers
Response time	Tens of milliseconds
HOA-20K driver	0 – 28 Vrms, 0 – 20 kHz, USB, battery 8 h, 94 × 32 × 20 mm, 80 g
LC-PROJ projector	Blue LED 470 nm, 1920 × 1080 pixels, 35 mm spot, calibrated linear gray levels, HDMI, 19 – 24 V DC
Software	Linux, Windows, macOS; Python client
Supplied with	Cables, power supplies, mounts, USB key, documentation, carrying case

Each OASLM is designed for its application: the values above are examples measured on HOASYS devices. Datasheets of the OASLM-VIS, HOA-20K and LC-PROJ give the full characteristics of each component.